

# **SOLAR OCCULTATION: PRESENT STATUS AND FUTURE PROSPECTS**

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Solar occultation measurements offer both long term precision and accuracy for atmospheric profiles of many constituents. Existing and proposed solar occultation satellite instruments will be briefly surveyed, but most of the presentation will be about the Atmospheric Chemistry Experiment (ACE) mission. ACE is making a comprehensive set of simultaneous measurements of trace gases, thin clouds, aerosols, and temperature by solar occultation from a satellite in low earth orbit. A high-resolution ( $0.02\text{ cm}^{-1}$ ) infrared Fourier Transform Spectrometer (FTS) operating from 2 to 13 microns ( $750\text{-}4400\text{ cm}^{-1}$ ) is measuring the vertical distribution of trace gases, and the meteorological variables of temperature and pressure. Aerosols and clouds are being monitored using the extinction of solar radiation at 0.525 and 1.02 microns as measured by two filtered imagers as well as by their infrared spectra. A dual spectrograph called MAESTRO extends the wavelength coverage to the 450-1000 nm spectral region. ACE was selected in the Canadian Space Agency's SCISAT-1 program, and was successfully launched by NASA on August 12, 2003 for a nominal 2-year mission. The satellite and instruments are still working well after more than 7 years on orbit. The first results of ACE were presented in a special issue of Geophysics Research Letters (<http://www.agu.org/journals/ss/ACECHEM1/>) in 2005 and a special issue on validation is available Atmospheric Chemistry and Physics ([http://www.atmos-chem-phys-discuss.net/special\\_issue69.html](http://www.atmos-chem-phys-discuss.net/special_issue69.html)); more information is available at <http://www.ace.uwaterloo.ca/>. A brief mission overview and status report will be presented. Science results for a few selected topics will be presented including the observations of organic molecules associated with air pollution, and the use of non-Voigt lineshape functions for routine retrievals.